



INDEPENDENT ASSURANCE SAMPLES AND TESTS FIELD SECTION 10

10.1 SCOPE. To establish procedures for sampling, testing and reporting Independent Assurance Samples (IAS) on all Federal-aid projects. Federal-aid projects are Interstate, Primary and Secondary projects let and administered by the Missouri Department of Transportation, and Off -System and Federal-aid Urban projects let and administered by a county, city, or the Missouri Department of Transportation.

10.2 GENERAL. These procedures apply to all Federal-aid projects. These procedures do not change normal job control procedures for any projects. NOTE: The term 'FAST' contained herein shall be interpreted to be:
(1) Federal-aid Acceptance Sampling and Testing (FAST) of aggregates performed by Materials personnel, or
(2) samples and tests performed by project personnel for project control.

10.3 GENERAL PROCEDURES.

10.3.1 The frequency at which IAS are to be taken on Federal-aid projects should conform in general with that set out in Table 1 of this section for the respective types of construction. The frequency may vary for individual projects or phases of projects in accordance with the level of control of the quality of materials or work.

10.3.2 It is not the intent that IAS of any work be taken at predetermined uniform intervals. A reasonable effort to avoid concentration of a large part of the prescribed number of IAS in one area or time period should be made.

10.3.3 For each type of construction or material shown in Table 1, the quantity to be used for determining the minimum number of IAS is the total quantity of that type within the project limits, except, IAS are not to be taken for bituminous mixtures or aggregate bases used for temporary construction which is to be maintained by the contractor and removed before final acceptance. Small quantities of materials accepted by Construction, County, or City, on the basis of visual inspection or producer certification of compliance are not to be sampled and tested for Independent Assurance. If the contract specifications waive specific requirements and allow acceptance by certification, visual inspection, etc., IAS are not required. If a test is shown in Table 1 but not required by the project contract, the IAS test is not required.

10.3.4 Each inspector assigned to Independent Assurance Sampling is to be fully equipped or have ready access to the equipment necessary to perform all field tests listed in Table 1, except nuclear density tests, asphalt binder content with a nuclear gauge, asphalt binder content with binder ignition oven, gyratory compactor and maximum specific gravity testing equipment. This equipment is to be used on a portion of the tests performed. As a guide, it is recommended that approximately 80 percent of each type of field test specified be performed by the Independent Assurance Sampler using equipment other than that assigned to project personnel, except when nuclear density testing, asphalt binder content by nuclear method, asphalt binder content by binder ignition method, gyratory compactor operation and maximum specific gravity testing are used. On the remaining tests to be made, the IAS inspector may perform the test, or participate in the sampling and testing, or witness the sampling and testing.

10.3.5 When nuclear density testing methods are used for project job control, the IAS inspector is not required to perform any of those tests. However, designation of the location for the test, witnessing the test, checking calculations, and reporting is required. In addition, the IAS inspector is to examine the latest Drift test and Stability test for the machine being used. The report is to state that the Drift test and Stability test were examined, and show the date of each of the tests. If Drift or Stability tests have not been performed as required, please note in the remarks.



10.3.6 When asphalt binder content, for normal job control, is determined by nuclear gauge or binder ignition oven, the IAS inspector is not required to perform any of those tests. However, observing the sample preparation, testing, checking calculations, and reporting are required. When the nuclear gauge is used, the IAS inspector is to review the statistical stability and drift test records for the nuclear gauge being used. The report is to state that the statistical stability and drift test records were reviewed and found current and satisfactory, or not. The asphalt content by nuclear gauge or binder ignition oven is to be reported on the appropriate test in SiteManager. The frequency of IAS is to be as shown in Table 1 of this section. If a plant is producing the same mixture for more than one project at a time, the IAS for asphalt binder content is to be credited to each of the projects receiving that mixture that day. Reports to the individual project will be required.

10.3.7 When a gyratory compactor is used for normal job control, the IAS inspector is not required to perform any of those tests. However, observing the sample preparation, testing, and reporting are required. When a gyratory compactor is used, the IAS inspector is to review the calibration records for the gyratory compactor being used. The report is to state that the calibration records were reviewed and found current and satisfactory, or not. The frequency of IAS is to be as shown in Table 1 of this section. If a plant is producing the same mixture for more than one project at a time, the IAS for the gyratory compactor is to be credited to each of the projects receiving that mixture that day. Reports to the individual projects will be required.

10.3.8 Independent Assurance tests may be performed in the Field, District Laboratory, or Central Laboratory in Jefferson City as condition and need dictates, unless shown otherwise in Table 1.

10.3.9 Test results are to be rounded off for reporting in conformance with the procedures set out in [General Sec 7](#) of this Manual.

10.3.10 All IAS aggregate gradation tests are to be "washed" and are to include each sieve specified. The size of sample and method of sieve analysis of fine and coarse aggregate is to be in accordance with [Field Sec 1001](#) of this Manual, except: (1) the size of hot bin gradation samples for bituminous mixtures shall be as shown in Section 400 of the Construction Manual, and (2) for coarse aggregate, the nominal maximum size of particle is to be considered as the largest sieve size on which material is retained. The sample size of fine aggregate may have to be adjusted in order to comply with the requirement in [Field Sec 1001](#) of this Manual, i.e., the fraction retained on any sieve at the completion of the sieving operation shall not exceed 4 grams per square inch (6 kg/m^2) of sieving surface. As a guide only, it is suggested approximately 400 grams be used as a sample size for fine aggregate for portland cement concrete (Specification Sec 1005.2.4.1) and approximately 100-150 grams for all other fine aggregate gradations.

10.3.11 IAS requirements for gradation, PI, or liquid limit tests on aggregates and base materials are to be fulfilled by obtaining the sample by one of the following methods.

- (a) By the FAST inspector taking a sample in the presence of the IAS inspector and then furnishing one-half of the sample to the IAS inspector. The FAST inspector is to perform the required tests and report the results as a Federal-aid Acceptance Sample and Test (FAST) in SiteManager. The IAS inspector would perform the required IAS tests on the other one-half sample, recording the results in SiteManager.
- (b) By the IAS inspector taking a sample and furnishing one-half of the sample to the FAST inspector currently assigned to that plant or location, who will then perform the required tests and report the results as a FAST. The IAS inspector would perform the required IAS tests on the other one-half sample.

10.3.12 SiteManager samples sent to the Central Laboratory are to be designated "Proj. IAS" in the Sample Type field. The sample record is to contain the prescribed information regarding the location and shall indicate the person designating the location and performing or witnessing the sampling.



10.4 SPECIFIC PROCEDURES.

10.4.1 Grading.

10.4.1.1 The location of tests, for both embankment and subgrade preparation are to include the approximate distance below final earthwork grade in addition to the station number and distance right or left of centerline. In the case of dual construction, outer roadway, or other construction, the roadway is also to be identified.

10.4.1.2 The frequency shown in Table 1 is total cubic yards (meters) within the project limits or accumulation of length in miles (kilometers) of individual embankments regardless of the number of pavement lanes on the embankment.

10.4.1.3 IAS density tests, other than nuclear, are to be located in the very near vicinity of the FAST density test performed by project personnel and are to be performed by the same method used by project personnel.

10.4.1.4 If density tests are not taken due to material being too rocky to test, a notation to that effect is to be noted on the IAS summary.

10.4.2 Aggregate, Sand-Soil, Soil-Cement, or Soil-Lime Bases.

10.4.2.1 IAS density tests, other than nuclear, are to be located in the very near vicinity of the FAST density test performed by project personnel and are to be performed by the same method used by project personnel.

10.4.2.2 Care should be taken to show the location of IAS tests by roadway, station, distance right or left of centerline or of the edge of pavement, number and nominal thickness of the lift or lifts identified shall be shown.

10.4.2.3 Samples of material for gradation or PI are to be obtained at a point just prior to use, i.e., stockpile, pugmill, spreader, belt feeder or bin discharge. The place of sampling and the approximate roadway station number where the material is laid is to be shown on the report. The samples are to be taken by one of the methods described in 10.3.11 of this Section.

10.4.3 Crushed Stone or Gravel Surfacing.

10.4.3.1 Samples for gradation are to be taken at a point just prior to use. The samples are to be taken by one of the methods described in 10.3.11 of this Section.

10.4.3.2 IAS are not required for Temporary Surfacing, Specification 104.6.

10.4.3.3 The report is to show the roadway, approximate station number where the aggregate is placed and the place of sampling.

10.4.4 Bituminous Mixtures.

10.4.4.1 The asphalt plant inspector may obtain the IAS samples for gradation provided the IAS inspector observes the sampling. The sample is to be split and the IAS test performed on one-half the sample. The other one-half of the sample would be tested by project personnel for acceptance purposes (FAST). The IAS inspector may perform the IAS test at the project using equipment other than project equipment, except, scales that have been calibrated within the immediate past 12 months may be used by both inspectors, or the IAS test may be performed in the District Laboratory, reporting results through SiteManager.

10.4.4.2 Hot mix gradation samples are to be reported in SiteManager.

10.4.4.3 Road mix gradation samples of aggregate shall be taken at a point just prior to use and shall be reported in SiteManager.

10.4.4.4 The FAST inspector may obtain the IAS samples for maximum specific gravity provided the IAS inspector observes the sampling. The sample is to be split and the IAS test performed on one-half the sample. The other one-half of the sample would be tested by project personnel for acceptance purposes (FAST). The IAS inspector may perform the IAS test at the project using project equipment. Both inspectors may use scales that have been calibrated within the past 12 months. However, the IAS inspector is to review calibration records for the maximum specific gravity testing equipment being used. The report is to state that the calibration records were reviewed and found current and satisfactory, or not. The frequency of IAS is to be as shown in Table 1 of this section.

10.4.4.5 Volumetrics (specific gravity of gyratory compacted specimens) should be determined on a set of specimens (pills) compacted by the FAST inspector using a gyratory compactor. The IAS inspector may use the same specimens that were produced when reviewing the FAST inspector operate the gyratory compactor.

10.4.4.6 IAS tests of compacted superpave asphaltic concrete pavement, plant mix bituminous pavement or plant mix bituminous base are to be performed on the same samples taken by the project inspector at the frequency shown in Table 1.

10.4.4.6.1 IAS tests may be performed in the District Laboratory or the Central Laboratory. When tests are performed in the District Laboratory, the test report is to show the location by roadway, station, distance and direction from centerline, and the lift designation of the course. If submitted to the Central Laboratory for testing, the identification sheet is to also show this information.

10.4.5 Portland Cement Concrete Pavement and Base.

10.4.5.1 IAS of aggregates are to be obtained at the batching plant from the belt or the bin discharge as they are proportioned for use and are to be taken by one of the methods described in 10.3.10 of this Section. The place of sampling and the approximate roadway station number where the aggregate is used is to be shown on the report. For coarse aggregate produced in more than one fraction, the gradation of each fraction, percent of each used and the combined gradation shall be shown.

10.4.5.2 The concrete sample for IAS for air and slump is to be from the same concrete sample taken by the project inspector for the FAST test.

10.4.5.3 Quantities of pavement and base are not to be combined for determination of the number of samples to be taken. IAS of PCC Pavement may not be used to fulfill the sampling requirements of PCC Base.

10.4.5.4 Independent Assurance Samples for pavement repair concrete are not required.

10.4.6 Concrete Masonry.

10.4.6.1 IAS of aggregates are to be obtained at the batching plant from belt or bin discharge as they are proportioned for use and are to be taken by one of the methods described in 10.3.10 of this Section. The place of sampling, class of concrete, structure and structure elements are to be shown on the report.

10.4.6.2 The concrete sample for IAS for air, slump, and cylinders is to be from the same concrete sample taken



by the project inspector for the FAST test.

10.4.6.3 IAS for miscellaneous items of concrete are not required. Examples of miscellaneous items are bearing pile, curb, barrier curbs, paved ditch, sidewalk and post bases. IAS are required for items paid for under Specification Sections 701, Pedestal Pile and 703, Concrete Masonry Construction, except barrier curb. IAS of miscellaneous concrete will not compensate for a deficiency of IAS of concrete used in culverts, retaining walls, etc.

10.4.6.4 IAS are not required for precast units.

10.4.6.5 A compressive strength test shall consist of molding two cylinders and the testing of each cylinder. The testing of IAS cylinders is to be performed in the Central Laboratory at 28 days. IAS cylinders are to represent routine compressive strength tests, not tests made for a specific operational control such as form removal, heat removal, etc.

10.5 COMPARISON OF TEST RESULTS.

10.5.1 All IAS test results, including those not meeting specifications and those IAS samples submitted to the Laboratory for testing, are to be compared with the companion FAST results by the inspector as soon as possible and the results reported. The IAS test result and the FAST test result should compare within the limits shown in Table 1. If the two tests do not compare within those limits, test procedures are to be reviewed, equipment checked, and if necessary, the test repeated to determine the reason(s).

10.6 SAMPLE RECORD.

10.6.1 Results of IAS are to be reported on the appropriate form in SiteManager with complete information shown. The reports should be submitted promptly after tests are completed, within ten working days at the latest.

10.6.2 IAS tests are not to be reported as "accepted" or "rejected". The IAS test result is not to be used for purposes of acceptance or rejection of material.

10.6.3 The following information is also to be on the IAS report:

10.6.3.1 The report shall state that the calculations were checked and are on file in the District Office. It will not be necessary for intermediate calculations to be shown on the report, since only the final result for the particular test is required, however all calculations shall be carefully checked for accuracy and maintained on file in the District Office.

10.6.3.2 The report shall state that test results of the IAS were compared with the FAST results. The Identification No. when used, date performed, and test results of the FAST are to be shown on the report. In addition, the comparison difference between the IAS and FAST is to be shown for each test result obtained. The report shall state whether the comparison was favorable or not favorable. If the comparison was not favorable, the probable reason(s) and any corrective action taken shall be shown on the report. If the FAST does not have an Identification No., other information shall be shown to identify the comparison FAST.

10.6.3.3 If the IAS inspector witnessed a test, state what parts of the tests were observed and include the statement "location designated, procedure and computations checked by the IAS inspector." The name of the project inspector performing the test is to be shown.

10.6.3.4 The report shall state where the tests were performed (Field, District Laboratory, or Central Laboratory) and what equipment was used (Materials or field personnel), e.g. "The test was performed in the District Laboratory

using Materials Equipment".

10.6.4 Each report is to be signed by the IAS inspector and the district Operations Engineer. The use of a rubber signature stamp by the district Operations Engineer will be permitted provided the stamped signature is personally initialed. In case of absence of the district Operations Engineer, a designated representative may sign these reports using their own name and title below the district Operations Engineer's name and title.

10.6.4.1 When using SiteManager and in lieu of a paper report, it is also acceptable for the Operations Engineer or designated representative to authorize the Sample ID through SiteManager. The Operations Engineer may designate a representative by submitting the name or names, to the State Project Operations Engineer by letter. Designation shall remain in effect until cancelled by the Operations Engineer. The IAS Inspector must be the creator of the sample record and may not authorize their own sample.

10.6.5 One copy of the report is to be submitted to the State Project Operations Engineer. Additional copies should be prepared for project and district Operations files. No letter of transmittal should accompany IAS reports.

10.6.5.1 The State Project Operations Engineer does not require a paper copy of the report, if it is properly created and authorized by the Operations Engineer in SiteManager.

10.7 SUMMARY OF INDEPENDENT ASSURANCE SAMPLES.

10.7.1 Upon completion of a project, all IAS tests are to be listed on a Summary of Independent Assurance Samples, using Impromptu report Summary of IAS.imr. Comments are necessary only when explanatory information is needed to supplement IAS reports.

10.7.2 Any deficiency in the minimum number of IAS for any material is to be acknowledged with an appropriate explanation.

10.7.3 If a portion of the project is constructed without Federal-aid participation resulting in no IAS being taken on that portion, a blank Summary of IAS.imr can be printed to denote this.

10.7.4 A separate summary is required for each project even though it may have been let in combination with other projects. The summary is to be signed by the district Operations Engineer and submitted to the State Project Operations Engineer. In case of absence of the district Operations Engineer, designated representatives may sign the summary using their own name and title below the district Operations Engineer's name and title. No letter of transmittal is required.

10.7.5 If the quantities in a project covered by these instructions are such that Independent Assurance Samples are not required, or if the type of construction for the project does not require Independent Assurance Samples, a letter is to be initiated by the District to the State Project Operations Engineer stating that condition.

